



May 2, 2017

City of Vancouver
Mr. Mayor and City Council members

Dear Mr. Mayor and Council members,

Vancouver Coastal Health (VCH) would like to thank the City of Vancouver for agreeing to enter into a collaborative process for the design of the section of the 10th Avenue travelling through the Health Precinct. Through this process, VCH and other major health stakeholders had the opportunity to provide valuable input into the design of this major transportation artery and to assist in the development of a solution that responds to the needs of the thousands of frail and elderly patients visiting the site daily.

The Health Precinct provides the highest level of care to the most vulnerable population not only of the Vancouver community but also to the province of BC. For this reason, careful attention to detail is required for any intervention in the Precinct. This solution recognizes the Health Precinct as a distinct area in the city of Vancouver where something special happens every day. The proposed solution not only responds to the special needs of our frail population but also recognizes 10th Avenue as an important corridor that needs to be safe and efficient for all users of all ages and abilities using any traffic mode.

VCH endorses the recommended solution brought forward to Council today. We are looking for Council approval and hope the spirit of collaboration that was apparent during this process will continue while both our organizations work together on numerous healths related projects serving the Vancouver and BC Community.

VCH also support in principal the requirement for two (2) Statutory Right of Ways on VCH/VGH property between Willow and Heather to accommodate sidewalks on the North and South side of 10th Avenue. We will direct our legal team to work with the city legal team to finalize the details of these documents.

Sincerely,

A handwritten signature in black ink, appearing to read "Mary Ackenhusen", with a long horizontal flourish extending to the right.

Mary Ackenhusen

cc. Laura Case
Glen Copping
Shelly Fleck
Stef Schiedon

May 2, 2017

City of Vancouver
Attn: Paul Storer, Manager, Department of Transportation

RE: 10th Ave Corridor Bike Lanes, Cambie to Oak St

Thank you for inviting the BC Cancer Agency to participate in the 10th Ave Corridor Collaborative Process and providing us with the opportunity to provide essential input into the design of the West 10th Avenue health precinct.

The Vancouver Cancer Centre serves not only the Vancouver region but also the province of BC and the Yukon. As the largest of six regional centres, the Vancouver Centre also provides specialized services not available elsewhere in the province. We are a patient-centred organization and therefore it is necessary that we advocate on their behalf of our patients and their families to ensure that the design serves the needs of the people who we serve. We appreciate that it is a stressful time after a person receives a cancer diagnosis, and our patients are already trying to manage with the burden of their disease and the side-effects of their treatment. As a provider of treatment and care we aim to promote their independence whenever possible and ensure their safety, and that includes their ability to easily and safely access our facility before and after their appointments.

Our priorities therefore must be to maintain and optimize traffic flow for our Vancouver Cancer Centre and BC Cancer Research Centre to facilitate patient drop-off and pick-up, accessible parking and timely delivery of essential supplies and equipment.

We recognize that any design of public space is met with competing interests. However, we appeal to the City of Vancouver to put the needs of cancer patients - particularly in this health precinct - above those needs that may normally take priority in other areas of the City.

We support the direction the collaborative process has taken; the design dated April 24, 2017 represents a significant improvement over previous designs that have been presented. The proposed statutory right of way at Ash St and 10th Ave is going through our internal review process and ultimately will require approval by the PHSA board. We look forward to continue collaborating with the City and other care providers in this health precinct to refine the design and make further improvements to this and other future initiatives (such as wayfinding) along West 10th Avenue from Cambie Street to Oak Street.

Sincerely,



Stephanie Aldridge
Executive Director, Cancer Strategy and Capital Redevelopment



FINAL REPORT

Collaborative Process for the 10th Avenue Corridor

April 18, 2017

Prepared by:

DIALOG, Toole Design, and Bunt and Associates

Prepared for:

The City of Vancouver, Vancouver Coastal Health, and BC Cancer Agency

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PART A

**PROJECT
BACKGROUND**

1 INTRODUCTION

To build on the planning and engagement work undertaken by the City of Vancouver in the upgrading of the 10th Avenue Corridor, the City, Vancouver Coastal Health (VCH), and BC Cancer Agency (BCCA) agreed to enter into a collaborative process to develop a shared resolution for the 10th Avenue right-of-way within the Health Precinct, between Oak and Cambie Streets. The outcome of this process is a preferred design option supported by Health Precinct Partners, and that addresses VCH and BCCA concerns about patient safety, access for patient drop-off, and parking availability for patients and visitors.

To arrive at a preferred concept, the partners engaged stakeholders within the organizations in three workshops, hosted two leadership team meetings, and held a number of smaller working team meetings. This report provides overview of: the work plan and stakeholder engagement plan; the stakeholder workshops and leadership team meetings; and the preferred design option.

ENGAGEMENT SNAPSHOT: A TIMELINE OF ACTIVITIES

Between December 2016 and March 2017, a number of meetings and workshop took place:



Consultants were engaged in the following roles to assist in undertaking the work:

- DIALOG (Integrated Design and Engagement Specialists) – Facilitation;
- Toole Design (Transportation Engineering/Planning) – Development of design concepts; and
- Bunt and Associates (Transportation Engineering/Planning) – Analysis of site accessibility, travel demand, traffic operations, and parking management.

2 WORK PLAN

What follows is the work plan for the collaborative process, developed by the partners at the project outset.



WORKPLAN - VCH + BCCA + CoV COLLABORATIVE PROCESS for 10th AVENUE CORRIDOR

Objective: Develop Shared Resolution to 10th Ave Congestion and Safety Issues.

Description of process:

As a follow up to the three series of Open Houses held by the City and based on the feedback received to date:

1. City and VCH have agreed to enter into a collaborative process to review all options for the proposed redesign of the 10th Avenue corridor.
2. VCH and CoV will be continuing their dialogue to ensure safe, effective and timely access to the VGH site for patients, while ensuring that the corridor is safe for everyone using the street, with a focus on vulnerable patients and their families first and foremost.
3. This process will be co-led by VCH/BCCA and the City with the assistance of external transportation design consulting team. The consulting team will:
 - Review all potential strategies to ensure the 10th Avenue corridor redesign best serves the complex needs of the patients and their families while respecting the constraints of the urban location of the site. This will involve drawing from existing related solutions that have proven to be successful in similar contexts.
 - Review the latest CoV 10th Ave Health Precinct design proposal, in light of the considerations listed below.
 - Review the feasibility of re-routing the 10th Ave Bike Route around VGH, looking at comparable examples from other cities.
 - Review other potential bike network changes in the vicinity of the 10th Ave Health Precinct with a view to improve conditions on the 10th Avenue corridor, in light of the considerations listed below.
 - Review parking management strategies to better serve VGH clients/visitors
 - Review access strategies for HandyDART, disability parking, pick-up/drop-off, and hospital transfers at key buildings adjacent to 10th Avenue, especially the Blusson building.
4. Leads from both VCH/BCCA and CoV must be copied on all communication with the external consultant team, and a least one representative from both VCH/BCCA and CoV must be present for every meeting/phone call/or other communication.

VCH/BCCA and City will consider options in view of:

- A. The Vancouver General Hospital, BC Cancer Centre and surrounding campus is a health precinct; VCH/VGH/BCCA core business is the delivery of health care services to patients (and their supporting families).
- B. Access to the Vancouver General Hospital and BC Cancer Agency (BCCA) sites is critically important for the access and safety of patients, especially efficient and intuitive access to the Emergency Department for both ambulance drivers and the general public.
- C. Improving the safety, comfort, and accessibility for people on foot, especially patients and vulnerable pedestrians.



WORKPLAN - VCH + BCCA + CoV COLLABORATIVE PROCESS for 10th AVENUE CORRIDOR

- D. The need to accommodate patient/client access needs of adjacent medical services, businesses, and other institutions, taking into account concern over the proposed removal of on-street parking and patient pick-up/drop-off needs at health services adjacent to 10th Avenue at which patients are often mobility and/or visually impaired: Eye Care Centre, Mary Pack Arthritis Centre and Blusson I-CORD Centre .
- E. Various loading requirements along 10th Avenue, such as semi truck traffic to the main loading dock on campus, food service deliveries from an off-site kitchen that occur twice daily every day of the week to Jim Pattison Pavilion and Banfield, and BCCA loading.
- F. A strong public interest in and City policy for preserving as much of the street's healthy and mature tree canopy as possible and associated with this, ensuring an attractive and comfortable pedestrian/public realm.
- G. Concerns in regard to the proposed half-block car-free zone on Heather Street north of 10th Ave.
- H. VCH/BCCA and CoV support the health and wellness of staff and the general public, and, as such, support and encourage active modes of transportation such as walking and cycling.
- I. Ensuring adjacent residents can continue to park within a reasonable walking distance of home.
- J. Ensuring the recommended design and alignment for the 10th Avenue bike route, whether re-routed or not, would be safe and comfortable for people of all ages and abilities to cycle.

Proposed Activities and Timelines

Two (or 3) Charrettes with City and VCH/BCCA teams – Facilitated brainstorming exercises to review options for 10th Avenue Corridor Design.

Internal workshops will take place to develop strategies and options internally.

3 STAKEHOLDER ENGAGEMENT PLAN

To guide the design and execution of stakeholder workshops, an engagement plan was developed to confirm engagement objectives and desired tangible outcomes.

OBJECTIVES

The objectives of this process were to:

- Create a positive tone and strong working relationship that will endure beyond the life of this process;
- Prioritize fairness, in which both health and City partners have equal input and say;
- Establish a high degree of inclusivity in which all participants feel heard;
- Reinforce the importance of a two-way dialogue in which active listening and mutual learning play a vital role;
- Convey the complexity of the project and recognize that a significant amount of analysis, engagement, and design work has been done to date, while being open to a broad and diverse range of possibilities/options;
- Ensure the “right people” are at the table, which includes individuals or representatives who are accountable for making final decisions;
- Demonstrate that the merits of each option have been explored, so that there is clear rationale driving the selection of the final option; and
- Instill a sense of creativity and inspiration in the process.

TANGIBLE OUTCOMES / DELIVERABLES

The tangible outcomes of this process were:

- Workshop 1 – A set of clear evaluation criteria with which to eventually weigh the merits of various design options;
- Workshop 2 – A set of design options; and
- Workshop 3 – A set of clearly defined and evaluated design options, including the merits and trade-offs associated with each, and recommendations on how to move forward with the shared preferred option(s).

PART B

**STAKEHOLDER
WORKSHOPS**

1 WORKSHOP 1: SHARED UNDERSTANDING AND EVALUATION CRITERIA

The first of three stakeholder workshops took place on December 8th, 2016 and provided the opportunity to:

- share hopes and concerns about the process;
- exchange information and analysis already undertaken through presentations by the City of Vancouver, Vancouver Coastal Health, and Bunt and Associates; and
- begin to co-create evaluation criteria for use later in the process to develop and assess the merits of design options.

HOPES AND FEARS

Participants provided input on their concerns, frustrations, and fears, and their hopes and aspirations about the process and its outcomes.

Emergent themes for “fears” included:

- inability to reach consensus;
- lack of flexibility;
- increased conflicts between modes in the corridor; and
- increased safety issues for cyclists and pedestrians, namely vulnerable patients.



Emergent themes for “hopes” included:

- a focus on looking forward and moving beyond past differences;
- identification of common goals, such as safe streets for all users; and
- arriving at solution in which partners can stand before Council with a shared recommendation.

EVALUATION CRITERIA

Participants provided individual responses to the question: “Which criteria should we use to develop the design options, evaluate their merits, and weigh trade-offs?”. The group collectively developed the following category headings to group individual responses:

- Minimize walking travel distance to services
- Respond to general parking needs
- Efficient access to ER
- Efficient emergency access to other facilities on 10th Avenue
- Road safety (e.g. fewer collisions)
- Perceived safer, more comfortable, more delightful experience
- Mode hierarchy (e.g. vulnerable pedestrians, other pedestrians; cyclists; good movement; cars)
- User priority (e.g. ambulance and fire; patients/families; goods; visitors; staff; through travelers)
- Future thinking (e.g. flexibility, adaptability)
- Overarching principles and plans

The outcomes of this brainstorming exercise were adapted to a “Hierarchy of Needs” exercise in Workshop #2.

2 WORKSHOP 2: DESIGN OPTIONS

The second of three stakeholder workshops took place on December 14th and provided the opportunity to:

- **consider and organize needs within a hierarchy** to help the design team consider trade-offs;
- **learn about design issues and examples of best practices** through a presentation from Toole Design; and
- **co-create design options** to be further evolved/developed by the consulting design team.

HIERARCHY OF NEEDS

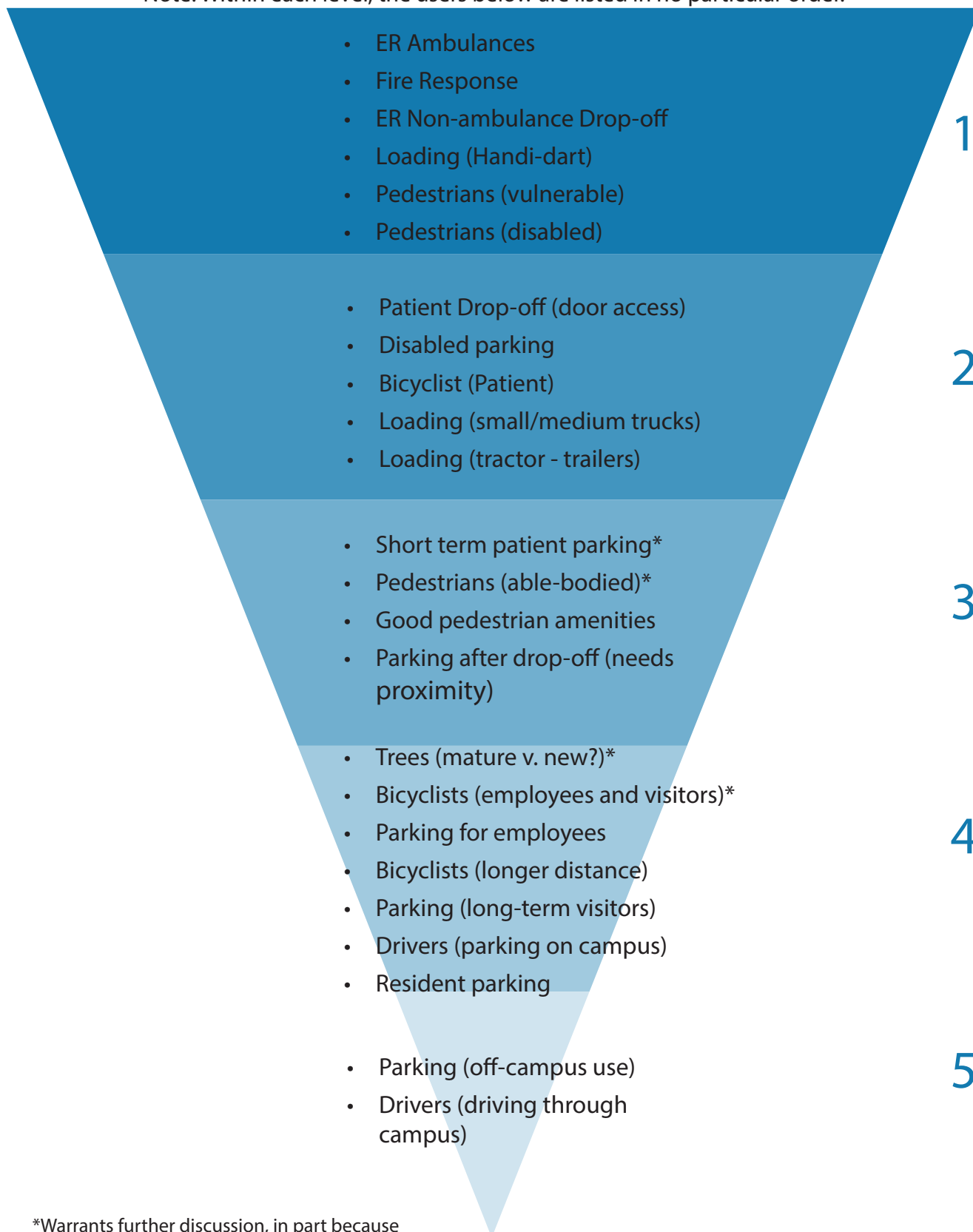
Building on the previous brainstorming exercise for evaluation criteria, participants established a Hierarchy of Needs for the different user groups of 10th Avenue in the hospital precinct. The hierarchy was to be used as a tool to inform design and evaluate options.

Results of this exercise (page 9) show where each user group falls within the five level hierarchy. Within each level, the users are listed in no particular order. Some elements were noted as warranting further discussion, in part because some needs could be accommodated outside of the right of way.



HIERARCHY OF NEEDS FOR 10th AVENUE HOSPITAL PRECINCT

Note: Within each level, the users below are listed in no particular order.



*Warrants further discussion, in part because some of these needs can be accommodated outside of the right of way.

DESIGN OPTIONS

Participants worked in three groups to consider the larger context of the hospital precinct, and to begin to consider design options for the corridor. The following design ideas emerged and were used by Toole Design to develop a series of design options in preparation for Workshop #3:

- The hierarchy of needs recognizes which uses should have priority
- Broader network options should be promoted to discourage cycling in the Health Precinct
- Specific user needs and design issues include (but are not limited to):
 - EMS access to be to two-way at least to Ash Street
 - Drop off zones are critical, particularly for the Eye Care Centre
 - Patients and vulnerable pedestrians need direct and efficient access
 - Loading functions are critical to hospital operations
 - On-street parking is sometimes used for for short term needs such as drop-off, short visits, etc
 - Longer term functions such as long-term visitor parking and out-of-district uses could be accommodated off-street
 - New parking management approaches may be needed to encourage appropriate parking use
 - Mature trees are important, but should be considered for removal if this provides a better solution for higher priority needs



3 WORKSHOP 3: EVALUATING DESIGN OPTIONS

The third of three stakeholder workshops took place on January 19th, 2017 and provided the opportunity to:

- **evaluate the design options** developed by Toole Design; and
- **revise the design options.**

DESIGN OPTION EVALUATION

Based on the outcomes of the previous workshops, Toole Design developed four options:

1. **Minimal Intervention, Traffic Calming** – This included: maintaining two-way flow throughout; utilizing traffic calming to reduce traffic and bike speeds; prioritizing pedestrians at intersections and crossings; and minimizing disruption to parking.
2. **Shared Streets, Traffic Calming** – This included: reducing traffic and bike speeds; reducing traffic volumes by introducing one-block, one-way shared street segment (with maintained two-way flow for EMS between Laurel and Willow Streets); prioritizing pedestrians; and minimizing disruptions to parking.
3. **Westbound-only Protected Bike Lane** – This included: maintaining two-way traffic flow; separating bikes from cars in one direction; maintaining drop-offs; trading other on-street parking for bikeway; and allowing more width on the segment between Oak and Willow Streets.
4. **Protected Bike Lanes in Both Directions** – This included: creating one-way flow westbound from Cambie to Willow Streets (in which EMS can mount bikeway to go in opposite direction); maintaining two-way flow from Oak to Willow Streets; maintaining drop-offs; and trading other on-street parking for bikeway.

Toole Design also explored other options, but did not bring them forward to participants at the workshop as they were seen as unfeasible. They included: bi-directional bikeways; elevated and subterranean bikeways; and street closures / new streets.

For the evaluation exercise, participants used the following colour scheme to determine how each of the four options addressed specific needs – as identified in the pre-established Hierarchy of Needs – and compared to current conditions:

- Green – This design responds well to this need.
- Yellow – This design responds the same as does current conditions to this need.
- Pink – This design does not respond well to this need.

The results are organized by option on the following page. In some instances, participants used multiple colours to evaluate individual needs. Some groups did not complete the evaluation for all options.

THEMES FROM DISCUSSION ON OPTION EVALUATION AND REVISIONS

Participants were encouraged to explore hybrid options and/or to suggest changes to the options. Among the ideas that were discussed – as well as from comments shared during the evaluation process – the following themes emerged and were used by Toole Design to develop a series of refined design options in preparation for leadership team meetings:

- Given much of the traffic on 10th Avenue is related to local health services, minimal intervention through the use of traffic calming alone would not reduce traffic volumes to a level comfortable for an AAA bikeway and reinforces the need for bikeway separation.
- Some of the traffic calming elements have benefits to reducing motor vehicles speeds, improving the interaction between modes, and most importantly improving the pedestrian environment.
- Some see two-way traffic flow between Oak and Ash Streets as critical to hospital operations including for emergency access, loading functions, and patient access and circulation.
- There was general agreement that one-way traffic flow westbound for the block between Cambie and Ash Streets is not critical to the operation of the Health Precinct and could be supported by VCH and BCCA if supported by other local stakeholders.
- There was concern about the operation of a shared street environment and, in particular, the possibility it would encourage people biking to encroach on pedestrian space and the ability for visually impaired and blind pedestrians to navigate the space safely.
- A mixed solution with separated bikeway in only one direction does not address the City's desire for an all-ages-and-abilities bikeway.
- The passenger loading zones are an important amenity for clinics and services in the Health Precinct. There is also a desire to maintain some short-term on-street parking and increase the number of accessible on-street parking spaces.
- The existing curb-to-curb width is not sufficient to accommodate two-way traffic flow, on-street parking, and protected bike lanes. Space outside the curbs are recommended and should consider potential loss of trees.

PART C

**LEADERSHIP TEAM
MEETINGS**

1 MEETING 1: REVIEW OF THREE OPTIONS

The first of two leadership team meetings – which included participation from a smaller group of senior managers, project leads, and members of the consulting teams – took place on February 3rd, 2017. The purpose of the meeting was to review and refine three design options, to determine which were acceptable to Health Precinct partners, before refining further to create a preferred option.

The three options included:

- 1. Traffic Calming and Pedestrian Improvements:** this included traffic calming features, pedestrian improvements, a section of curbless street, and an option for how a drop-off could be created in front of Blusson. This option retained as much parking and as many trees as possible, but does not include separated bikeways.
- 2. Protected Bike Lanes in both Directions:** this included unidirectional bikeways on either side of the street, retention of most of the on-street parking, but required removal of most of the trees from the corridor.
- 3. Protected Bike Lane, Westbound:** this included a unidirectional bikeway on the north side of the street with bicyclists sharing the roadway with motor vehicle traffic in the eastbound (downhill) direction. It retains most of the on-street parking, but requires removal of most of the trees on the north side of the street.

DESIGN OPTION REVISIONS

None of the options presented provided a solution that met all the needs of the stakeholders. For example, Option 1 retained on-street parking and all the trees along the corridor, but provided no separation for bicyclists. With only a very limited reduction in traffic volumes expected from traffic calming, this is not considered an AAA bikeway solution.

Option 2 retained on-street parking, but created separated bikeways at the expense of removing nearly all the trees from the street, which would not be an acceptable outcome. Similarly, Option 3 looked at whether removing trees from just the north side of the street would achieve an acceptable design outcome, but it only provides separation for bicyclists in one direction and is not considered an AAA bikeway solution.

These designs were useful as they showed that to achieve the stakeholders' goals for the project, space would need to be created through block-by-block trade-offs that balance tree removal, on-street parking conversion, relaxation of design standards, and opportunities to use private property through statutory rights-of-way. The leadership group went through these trade-offs for each half block and include the following ideas:

- Oak – Laurel: Trees on the south side are set-back from the curb and provide space to create a protected bike lane eastbound. On the north side, trees could be removed and some of the resident parking spaces repurposed to create a protected bike lane westbound.
- Laurel – Laurel: Landscaping should be cleared out of the area in front of emergency on the south side of the street to improve sight distance at the emergency room driveways. Strategic tree removal and conversion of some of the resident parking spaces will create additional space on the north side of the street.

- Laurel – Willow: Younger trees could be relocated on the south side of the street and some metered parking could be repurposed on the north side of the street. Some tree removal would likely be required on the north side of the street as well.
- Willow – Heather: There is an opportunity to create a statutory rights-of-way to use some property in front of the Heather Pavilion and in front of the future PHIX building and the existing Eye Care Centre. However, tree removal will likely also be necessary on the north side of the block. Parking in this block is the most utilized in the study area and as much as possible will be retained.
- Heather – Ash: There is an opportunity to create a statutory right-of-way to use some of the property in front of the vacant lot owned by PHSA. Much of the metered parking in this block could also be converted and some isolated tree removal may also be necessary.
- Ash – Cambie: Two-way traffic flow in this block is not critical to the operation of the Health Precinct and could be reduced to one travel lane. Metered parking could also be converted to additional space for separated bikeways.

2 MEETING 2: REVIEW OF THE PREFERRED OPTION

The second of two leadership team meetings took place on February 23rd. The purpose of the meeting was to review and refine the preferred design option, which was generally characterized by:

- Retaining two-way traffic flow between Oak and Ash Streets;
- One-way traffic flow (westbound) between Cambie and Ash Streets;
- Retaining two-way traffic flow on all side streets;
- Encroachment into privately owned properties to minimize tree removal;
- Retention of critical parking needs including expansion of the existing passenger loading zones (PLZ) and creation of additional accessible parking; and
- Pedestrian improvements and traffic calming elements such as curb extensions, raised intersections, and raised crosswalks.

PREFERRED DESIGN OPTION REVISIONS

The leadership group offered comments on the design. Key comments are listed in Table 1 below and were incorporated into the Recommended/Preferred Design Option presented in Part D.

TABLE 1: KEY BLOCK BY BLOCK DESIGN IMPROVEMENTS TO EXISTING CONDITIONS

| Block | Design Improvements |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Laurel-Laurel | <ul style="list-style-type: none"> • Shift bikeway and sidewalk on the north side of the street to avoid the mature tree and to create as many disabled or resident parking spaces as possible. • Continue to refine the design of the bikeway through the emergency driveways and find examples of these facilities at other emergency rooms and hospitals. |
| Laurel-Willow | <ul style="list-style-type: none"> • Redesign the east end of the block to retain trees and remove parking east of the Skin Care driveway. • Redesign the west end of the block so that parking does not restrict access and egress of trucks from the main loading court. • Convert on-street spaces to more passenger loading zones spaces and accessible parking spaces. |
| Willow-Heather | <ul style="list-style-type: none"> • This is the most heavily used block for parking related to the Eye Care center and other nearby uses; resolved to retain as much parking as possible on this block and trade off boulevard trees. • Increase the number of passenger loading spaces and create accessible parking spaces on this block. • The Blusson accessible parking lot will be retained, but will be accessed via W 12th Avenue; the driveway from W 10th Avenue will be closed. |
| Heather-Ash | <ul style="list-style-type: none"> • Discussion between partners about the need for any parking on this block. • Creating a bend in the roadway to accommodate a pedestrian and bicycle right of way on Provincial Health Services Authority land, in order to help maintain mature trees. |
| Ash-Cambie | <ul style="list-style-type: none"> • Refinement needed to the one-way approach on the east leg of the Ash Street intersection to better align it with the west leg. |

PART D

PREFERRED

DESIGN CONCEPT

The preferred design concept for W 10th Avenue between Oak Street and Cambie Street is shown on Figures 1A – 1E. The study segment is approximately 850m long and includes seven intersections and numerous driveways. This section of the report describes the critical elements of the design and the considerations that went into its development.

1. DESIGN OBJECTIVES

The input received from the collaborative process was used to develop a framework for design as follows:

1. The partners recognize the importance of the Health Precinct as a regionally-significant health care provider and the importance of 10th Avenue to the operation of the Health Precinct. W 10th Avenue currently provides:
 - Vancouver General Hospital (VGH) emergency room access and egress.
 - Loading functions and access to the main loading court.
 - A key pedestrian corridor for movement through and around the campus.
 - A high proportion of disabled, elderly, and infirm patients and pedestrians that have special mobility needs.
 - Access to numerous patient services and clinics, several with short-term parking and drop-off.
 - An important link in the City's bike network.
2. The City aims to improve the comfort and safety of people walking in the Health Precinct while also improving the W 10th Avenue Bike Route to an All Ages and Abilities (AAA) facility. In the Health Precinct, motor vehicle traffic volumes, modal interactions, and a number of other factors introduce the need for separation of modes to provide an AAA bikeway and better organize interactions between modes.
3. Through the collaborative process, the Health Precinct partners recommended that the City of Vancouver explore the feasibility of developing an east-west bikeway on W 14th Avenue and a north-south bikeway connection on one of Spruce, Alder, or Birch Streets. It was also recommended that the W 7th Avenue and W 14th Avenue bikeways be developed as AAA standard bikeways so as to promote alternative bike routes to the Health Precinct.
4. Even with high-quality alternative bike routes in place, there will remain high volumes of bikes (including those to the Health Campus) on W 10th Avenue and, as such, the Health Precinct partners are committed to accommodating bicyclists as best as possible within the framework of maintaining or improving the critical functions of the Health Precinct.
5. Design decisions were made based on feedback from the partners and in accordance with the "hierarchy of needs" developed by the partners.

2. SUPPORTING TRAVEL & PARKING ANALYSIS

Bunt & Associates conducted a number of travel and parking surveys in the Health Precinct that were used to inform the design process and the preferred design concept.

TRAVEL DEMAND CHARACTERISTICS

Daily Person Trips and Mode Split

A significant portion of the travel demand on W 10th Avenue is accommodated via non-auto modes, although auto mode share was observed to be highest during an October weekday observation period. Between the hours of 6AM to 6PM on October 6, 2016, there were approximately 10,300 people travelling east-west along the W 10th Avenue Corridor just west of Heather St, between the hours of 6am and 6pm. Of these, 57% of them travelled in vehicles, 33% were walking and 11% were cycling. During the peak summer cycling months, cycling activity on the corridor is known to increase by 70% to 130%, which would increase the number of total person trips but also the percentage of people cycling.

Vehicle Demand and Routing Patterns

- W 10th Avenue serves an important vehicle access function for the Health Precinct. There are currently 10 driveway accesses that serve the Health Precinct on the W 10th Avenue corridor, 1 on the north side and 9 on the south side of the Street.
- During the peak mid-day hospital peak person trips hour (Noon to 1pm), approximately 10 vehicles enter and exit these driveways on the north side of the corridor, and 260 vehicles enter and exit the driveways on the south side of the corridor.
- 10th Avenue also provides a key travel route to the underground parking located at the Gordon and Leslie Diamond Health Care Centre (368 Stalls), due to left turn restrictions from 12th Ave onto Laurel Street.
- License plate surveys were conducted along W 10th Avenue and Heather Street in order to understand the driver routing patterns on the section of W 10th Avenue between Oak Street and Heather Street as well as the section of Heather Street between Broadway and W 12th Avenue.
 - Approximately 86% of the vehicles travelling eastbound and 68% travelling westbound on W 10th Avenue were associated with the Health Precinct;
 - Approximately 65% of the vehicles travelling northbound and 58% travelling southbound on Heather Street were associated with the Health Precinct.

Loading Activity

Loading demand observations were conducted in early May 2016 to document the loading activities at various buildings within the Health Precinct. There are two major loading facilities in the Health Precinct that are accessed directly via W 10th Avenue: the VGH Centralized Loading Facility at Jim Pattison Pavilion and the BC Cancer Agency (BCCA) loading facility. The Jim Pattison Pavilion Loading Facility has a daily loading demand of approximately 90 vehicles, which are split approximately 50%/50% to the west and east on W 10th Avenue. The BCCA loading facility has a daily loading demand of approximately 30 vehicles, most of which arrive from the west and leave to the east. The loading facility at BCCA is currently configured to accommodate trucks entering from the eastbound direction.

ON-STREET METER PARKING DEMAND CHARACTERISTICS

There are 57 metered parking spaces along the section of W 10th Avenue within the Health Precinct between Ash Street and Oak Street. These stalls were observed to be often used for short-term patient and visitor trips to the Health Precinct.

- The stalls were observed to be almost fully utilized during the peak activity period of the Health Precinct. A total of 490 unique vehicles were served by the metered parking stalls during the observation period, 6 am to 6 pm on September 30, 2017, serving about 735 drivers and passengers combined. The results only include vehicles where the arrival and departure time was observed. Vehicles that were already parked or still parked when the observation period ended were excluded;
- An intercept survey of drivers parking in these stalls confirmed 85% were visiting buildings within the Health Precinct; of this 85%, about half were associated with two buildings: the Eye Care Centre and the BC Cancer Agency. Daily site population numbers for the Health Precinct are not known for this observation, but we do know based on patient and visitor interview surveys that approximately 13% of drivers said they parked on the street frontages of the Health Precinct, which include 10th Avenue, Laurel, Heather and Ash Streets fronting the Health Precinct.;
- The average duration of stay was 66 minutes. The 10th Avenue street parking durations are shown in Figure 1A and,
- The average turnover rate for the meter parking stalls was 0.72 vehicles per stall, per hour, which shows that people are parking for longer than an hour. This rate is considered low turnover, compared to other commercial street environments which typically sees 2-3 vehicles per stall, per hour.

FIGURE 1A: 10TH AVENUE PARKING DURATIONS

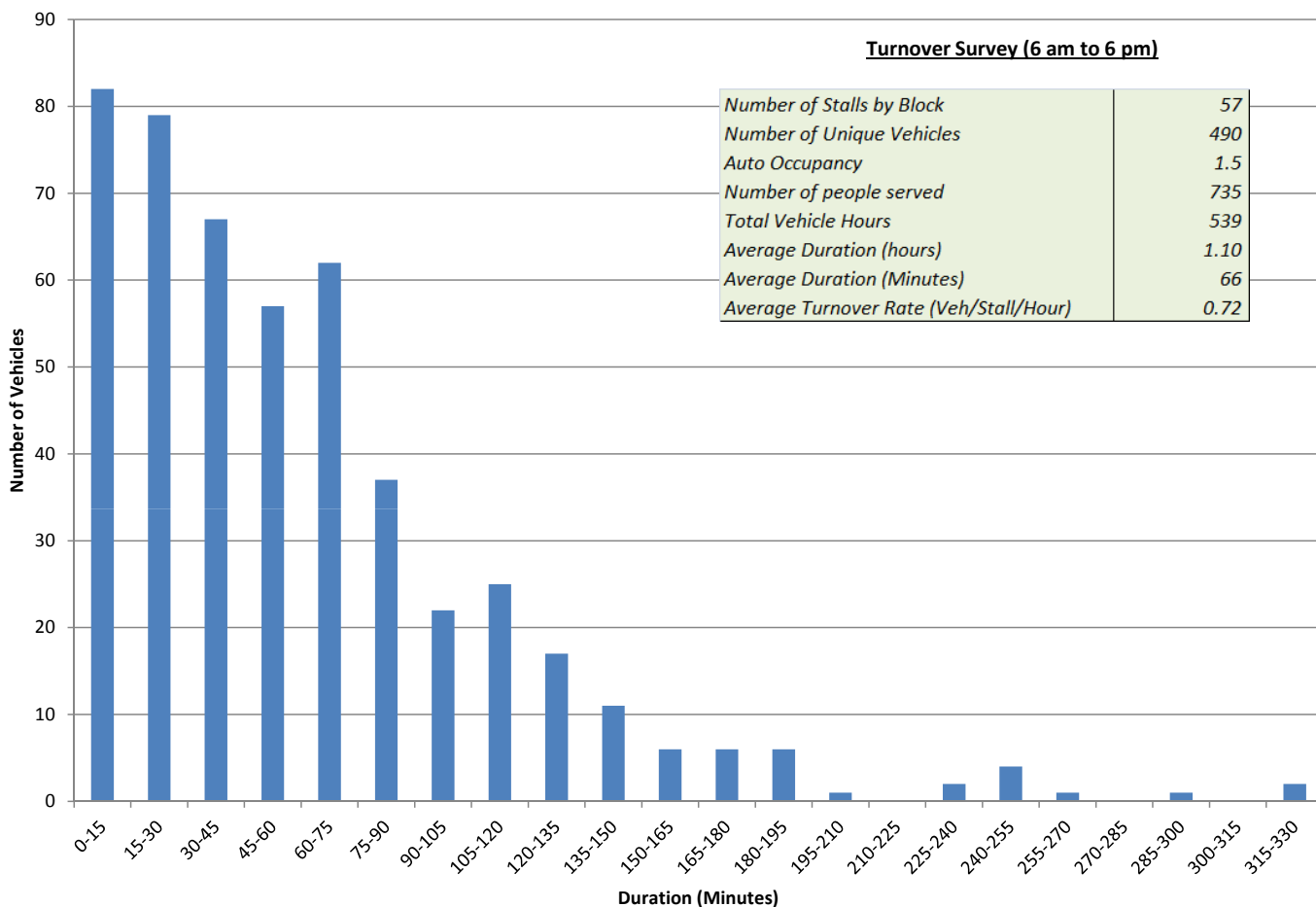


FIGURE 2A:

Preferred Design Concept: Oak Street to Laurel Street

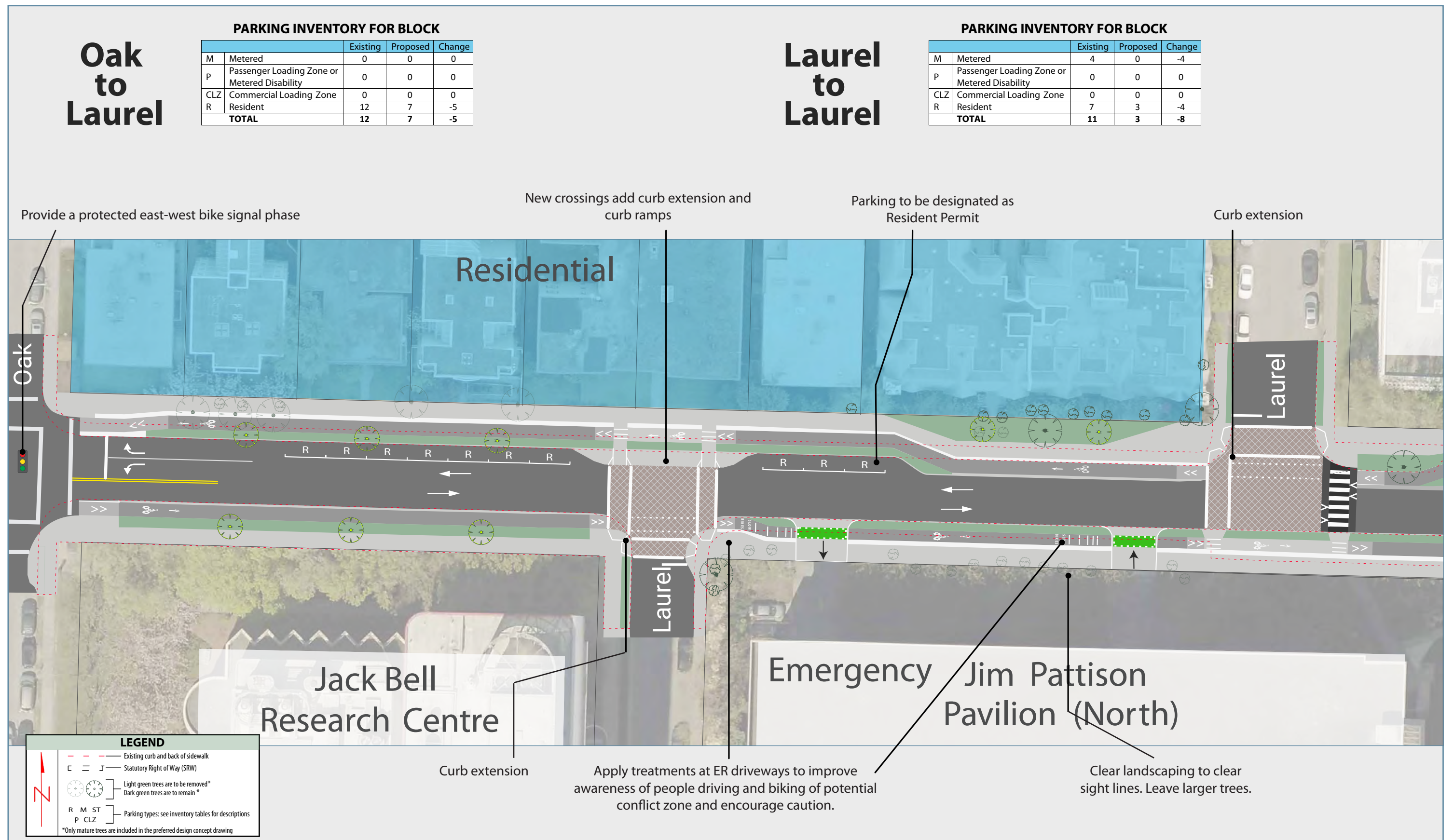


FIGURE 2B:

Preferred Design Concept: Laurel Street to Willow Street

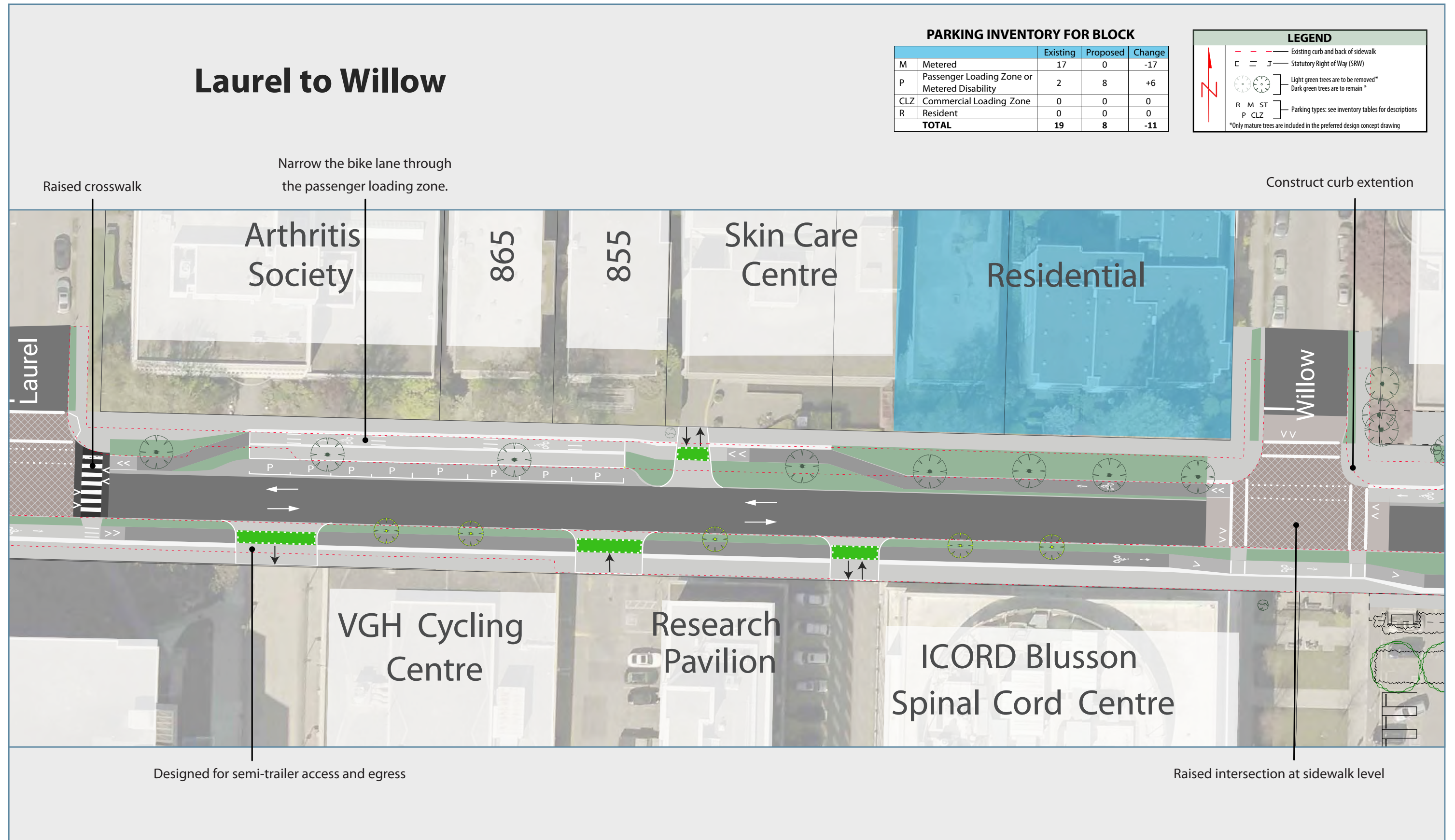


FIGURE 2C:

Preferred Design Concept: Willow Street to Heather Street

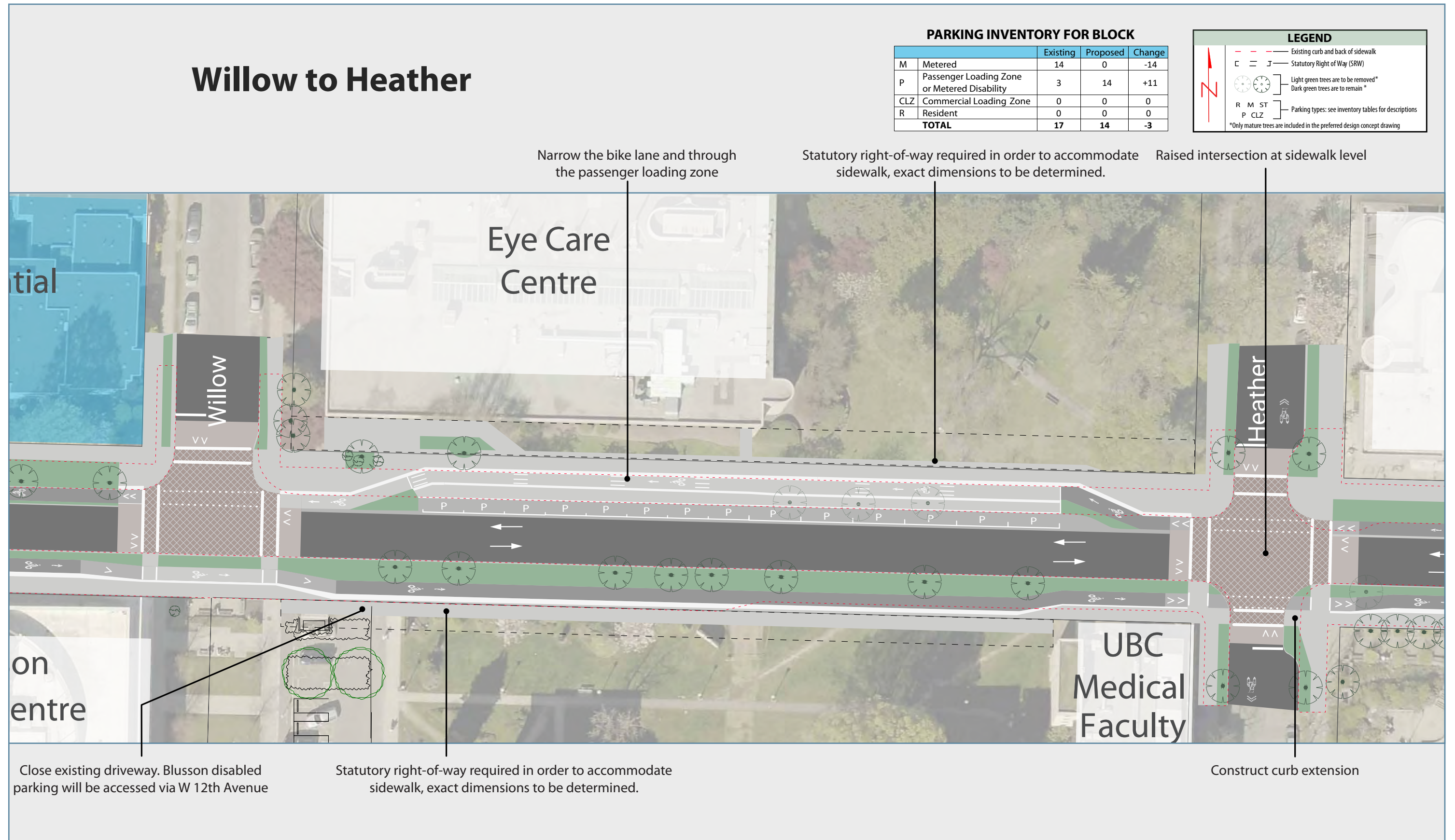


FIGURE 2D:

Preferred Design Concept: Heather Street to Ash Street

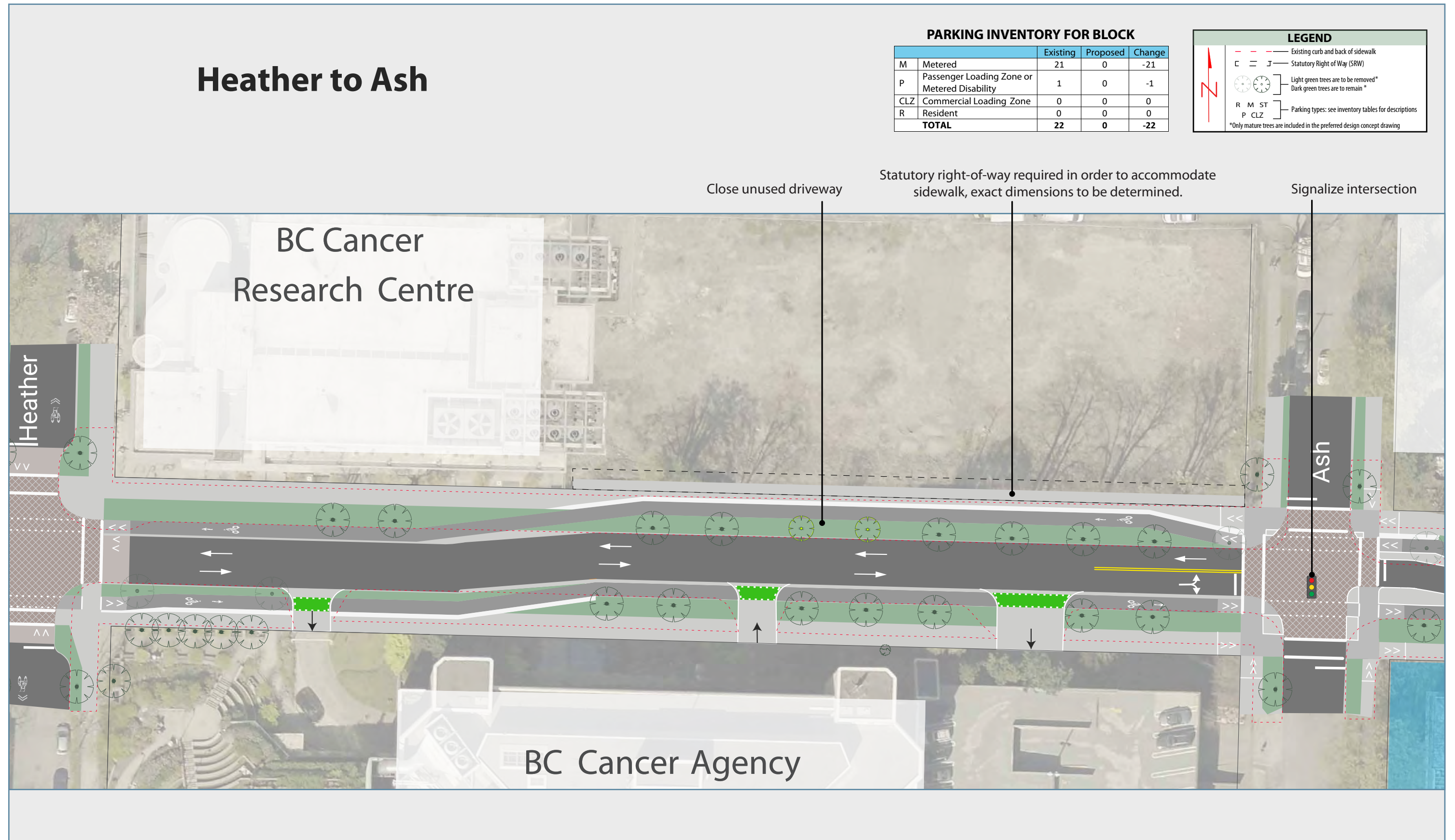
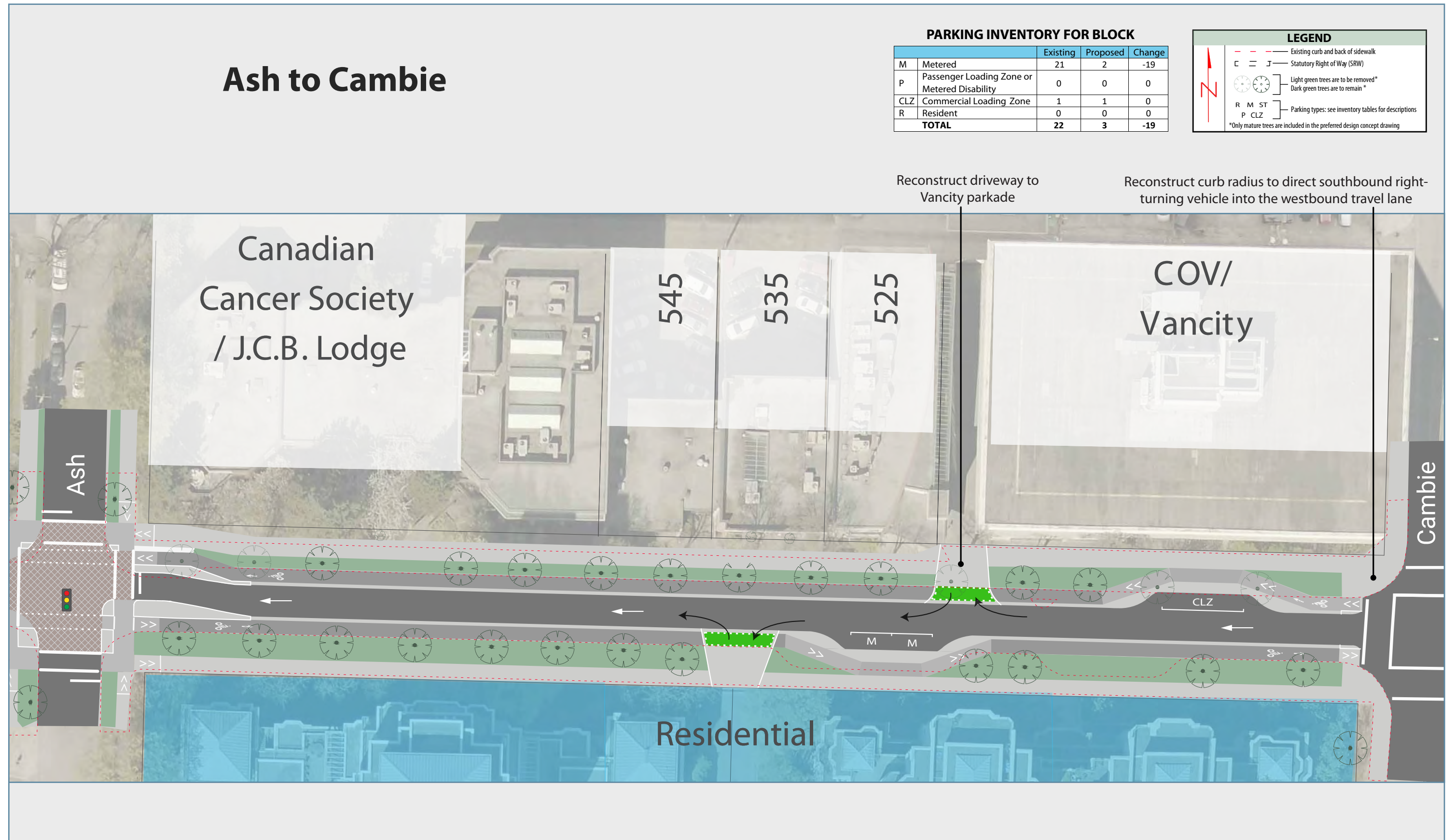


FIGURE 2E:

Preferred Design Concept: Ash Street to Cambie Street



3. OTHER DESIGNS CONSIDERED

Several alternative designs were considered prior to the development of the preferred design concept. These are summarized in Table 1 along with the reasons why these were removed from consideration.

TABLE 1: ALTERNATIVE DESIGN OPTIONS CONSIDERED

| DESCRIPTION OF OPTION | REASON FOR REMOVAL |
|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Traffic calming including speed humps, vertical and horizontal deflection, etc. | Traffic calming reduce motor vehicle speeds and improve the interaction between pedestrians, bicyclists, and other street users. Some of these treatments, e.g., raised intersections, curb extensions, raised crosswalks, etc. have been incorporated into the preferred design concept. However, traffic calming alone would not bring traffic volumes below the City’s typical threshold for a shared roadway due to the demand of people who need to go to the Health Precinct. |
| Re-routing bicyclists to a parallel street | <p>Several parallel streets were considered for short-distance detours for bicyclists around the Health Precinct. These included the alley between W 10th Avenue and Broadway. However, there is poor sight distance at many of the driveways in this alley, significant interaction and cross streets with service vehicles, and difficult street crossings at major intersections that would likely discourage bicyclists from using this route and result in very little detour from W 10th Avenue. W 12th Avenue is an arterial traffic route and not a comfortable bicycling route. There may be future opportunities to incorporate bicycling facilities as part of a future reconstruction of Broadway, but this is not imminent.</p> <p>It was however recognized that the City should improve the W 7th Avenue and develop W 14th Avenue bikeways to give people an alternative to W 10th Avenue. Nevertheless it is recognized that W 10th Avenue is the most direct route for many bicyclists including those coming to the campus and that there will always be a significant volume of bicyclists using W 10th Avenue.</p> |
| One-way traffic flow between Cambie and Willow | One-way traffic flow (westbound) for the block between Ash and Cambie Streets has a minimal impact on the Health Precinct and is a feature of the preferred design concept. Ash Street to Williwow Street, there are a number of traffic and circulation impacts and as such this option was removed from consideration. |
| Protected bike lane westbound (uphill) and shared roadway eastbound (downhill) | This option would provide physical separation in the westbound (uphill) direction but would have bicyclists share the roadway in the eastbound (downhill) direction as they do currently. This only provides separation in one direction and so does not meet the City’s goal to improve 10th Avenue to be a safe and comfortable option for people of all ages and abilities to bike. |

| | |
|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bi-directional bikeway on north or south side of W 10th Avenue | Options for a bi-directional bikeway on either the north or south side of the street were investigated. The primary concerns with bi-directional bikeways on one side of the street is that other road users, e.g., pedestrians, turning motorists, etc., often do not expect bicyclists coming from both directions. As a result, these types of bike facilities work best where there are few driveways, pedestrian crossings, etc. and it would be difficult to transition the facility from one side of the street to the other to minimize interactions with the emergency room driveways on the south side of the street and the passenger loading zones on the north side of the street. |
| Shared Street | The idea of a shared street environment was considered, but there were concerns that motor vehicle traffic volumes are too high on this corridor and that the design would not provide sufficient delineation between modes of travel. In particular, there are significant design challenges in making the distinction between pedestrian and motor vehicle space for sight-impaired and blind pedestrians. There was also a concern that bicyclists may ride in the pedestrian space given the street's high vehicle volumes. |
| Elevated Bikeway | This was considered at a high level and removed due to concerns about steep grades to achieve the necessary clearance over intersection streets, usability, high costs, connectivity to the surrounding land uses as well as intersection bike routes, impacts on the streetscape and tree canopy, and convenience. If it isn't easy to access and egress by bike, people would likely choose to continue using the street. |

4. OVERVIEW OF THE PREFERRED DESIGN CONCEPT

The key elements of the preferred design concept include:

- Maintaining two-way traffic flow between Oak Street and Ash Street.
- Converting the block between Cambie Street and Ash Street to one-way westbound.
- Improvements to the pedestrian realm: raised intersections, raised crossings, bulges, etc.
- Creating unidirectional protected bike lanes on either side of the street.
- Maintaining critical hospital functions including ambulance service routes, access to the emergency room, and loading functions.
- Retaining critical access to the services and clinics along W 10th Avenue, including increasing the number of passenger pick-up and drop-off spaces and as much priority and accessible parking as possible.
- Minimizing the loss of mature and significant trees.
- Maintaining 2-way traffic on all side streets.

Each block is unique along the corridor and as such different trade-offs were considered in every block to determine how space would be used to accommodate the design needs. These are summarized in Table 2.

TABLE 2: CONSIDERATION OF TRADE-OFFS

| ELEMENT | CONSIDERATIONS |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bicycling Infrastructure | Are there places where the desirable bike lane width can be narrowed? |
| Motor Vehicle Circulation | The Cambie to Ash Street block was converted to one-way westbound to be able to accommodate protected bike lanes without significant loss of trees |
| On-Street Parking | Which parking user is most critical and where do they need space? Where can less critical parking be relocated or removed to create space for high-priority street uses? |
| Tree Removal | Where can trees be removed to create space for high-priority street uses? Are there locations where this is the only trade-off that can be made? |
| Statutory Right-of-Way | Are there strategic locations where it makes sense to encroach the sidewalk into private property to accommodate a better design for everyone? |

4.1 PEDESTRIAN REALM

Intersections:

- Raised intersections were included at the Willow Street and Heather Street intersections to bring all road users to the same grade as the sidewalk. This has a number of benefits including minimizing grade changes for vulnerable pedestrians. Raising the intersection also slows drivers entering intersection.
- A raised crosswalk is included on the east leg of the Laurel Street (east) intersection. A raised intersection is not possible at this intersection because the primary ambulance response routes between Oak Street and Laurel Street (east) need to be maintained clear of bumps and delay.
- Curb bulges were used at intersections where vehicle turning paths allowed this design. These treatments shorten crossing distances and improve visibility of pedestrians at intersection crossings.

Accessibility:

- Curb ramps and/or refuge spaces should be used at all pedestrian crossings that are not at sidewalk grade, and where possible, intersection corners should be designed to include curb ramps at 90-degrees to the street to align with the crosswalks and define the safest path across the intersection.

4.2 HEALTH PRECINCT OPERATIONS

Emergency Room and Ambulance Movements:

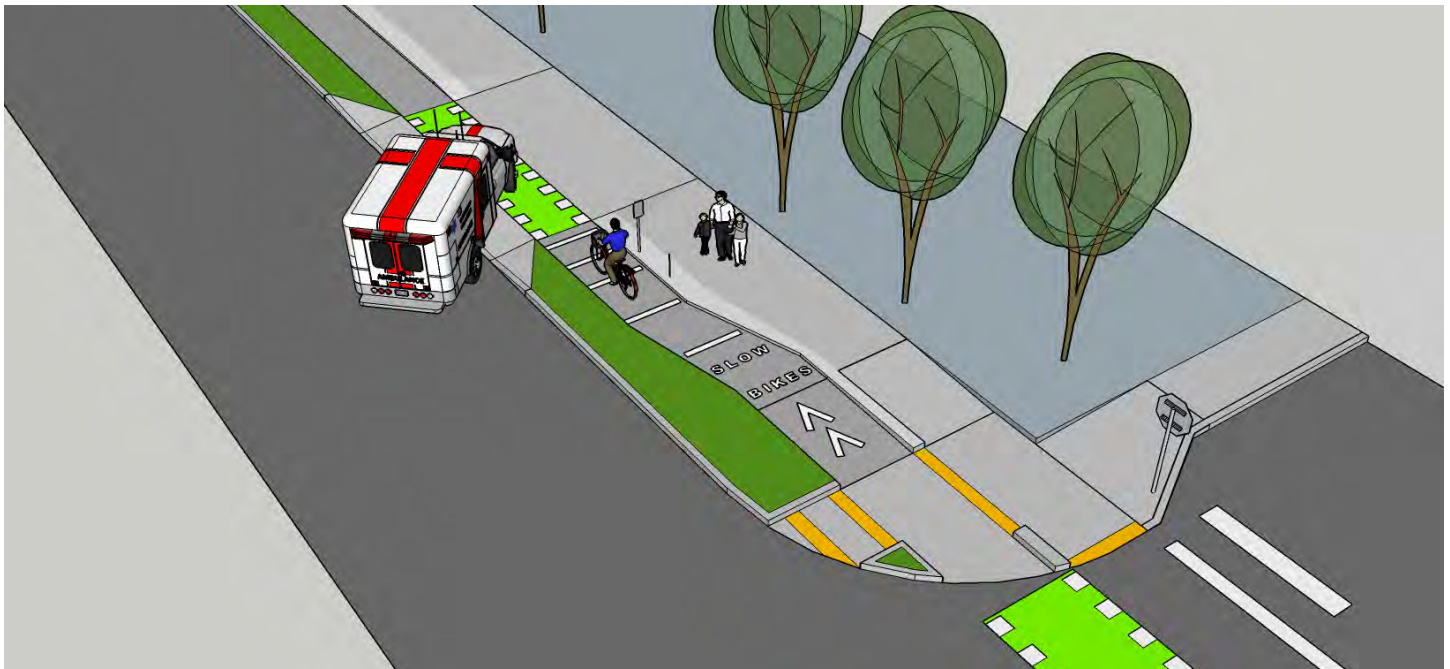
- The primary access and egress routes for ambulances on W 10th Avenue are to and from Oak Street, Laurel Street (west), and Laurel Street (east). Treatments that could slow response time, such as raised traffic calming elements were not applied west of the Laurel Street (east) intersection.
- The emergency room driveways are subject to the same rules of the road as any other driveways, however, it is recognized that these locations are unique locations and so managing modal

interactions is of the highest priority. A number of striping, signage, and design elements are proposed to increase awareness between modes and to manage vehicle and bicycle speeds at these driveways. The access driveway is particularly important as drivers are turning across the bikeway and may be more panicked and rushing to bring patients to the emergency room. Their entry speeds need to be managed to provide safe use of the street for others, including pedestrians, bicyclists, and people using the emergency room drop-off. Potential design treatments for these driveways are highlighted on Figure 3. Vancouver has an existing example of a bike lane crossing an ER driveway at St. Paul’s Hospital on Burrard Street.

Service Vehicles:

- W 10th Avenue is critical to the day-to-day function of the hospital and includes deliveries and loading to numerous buildings and access to the primary loading court. Driveways and intersections were designed for the appropriate design vehicles servicing the precinct.

FIGURE 3: EMERGENCY ROOM DRIVEWAY TREATMENTS.



Traffic Flow:

- As described earlier, maintaining two-way traffic flow between Oak Street and Ash Street was important for the Health Precinct partners. However, one-way traffic flow in the westbound direction between Cambie Street and Ash Street has limited impact on Health Precinct operations. Providing one-way traffic flow in this block allows protected bike lanes to be developed within the existing curbs and minimal impact to mature and significant trees.
- It is recommended that the W 10th Avenue / Ash Street intersection would be signalized. This would help with traffic operations at this intersection and would improve the interactions between different road users.
- The City recommends introducing a dedicated east-west bicycle/walk phase at the Oak Street intersection.

4.3 BICYCLING INFRASTRUCTURE

- The recommended design features uni-directional protected bike lanes on either side of the street throughout the Health Precinct. It is expected that protected bike lanes would not only better organize roadway space, but would improve interactions between different modes. There would be clear expectations for where bicyclists will be on the street and clear identification of right-of-way. These features are summarized on Figure 4.
- The majority of the preferred design concept includes a physical buffer between the bike lane and the travel lane (as shown in the example shown on Figure 3). This provides a physical separation for bicyclists and prevents vehicles from using the bike lane to drop-off passengers.
- The bikeway will be “wrapped” behind passenger loading zones and accessible parking spaces to eliminate conflicts between people driving in/out of these spaces and people biking along 10th Ave.. These areas are recommended to be built at sidewalk level and require a “landing area” between the parking space and the bikeway to give people a comfortable space to get in and out of their vehicles. Figure 5 shows an example from Vancouver, WA of how this space could be delineated (although without the bike lane).



FIGURE 4: ELEMENTS OF A PROTECTED BIKE LANE



FIGURE 5: DELINEATED LANDING AREA IN VANCOUVER, WA

4.4 ON-STREET PARKING

- Table 4 shows the existing on-street parking supply on W 10th Avenue by block and the type of parking. Table 5 shows the proposed breakdown of parking for the preferred design concept.
- On-street parking plays a critical role at certain locations to provide door or near-door access for the various clinics along W 10th Avenue. This includes passenger loading zones for drop-off and pick-up of patients at the Eye Care Center and the Mary Pack Arthritis Center. Short-term parking also serves short-stay visits such as checking patients into appointments, etc.
- In order to meet demand for passenger loading zones (PLZ) and for more disabled parking, the preferred design concept:
 - Expands PLZ space at the Eye Care Centre.
 - Expands PLZ space at the Mary Pack Arthritis Centre.
 - Adds new accessible parking spaces on 10th Avenue.
 - Retains accessible parking at the Blusson Spinal Cord Center with access from W 12th Avenue and the driveway onto W 10th Avenue closed.

4.5 TREE REMOVAL

- The design attempted to minimize the impacts to mature and significant trees, but some trees will need to be removed to accommodate priority street functions in certain locations.
- The preferred design concept provides space to plant new trees. Specific new tree placement will be determined during detailed design.

TABLE 4: EXISTING ON-STREET PARKING INVENTORY BY BLOCK AND PARKING TYPE

| | OAK TO LAUREL | LAUREL TO LAUREL | LAUREL TO WILLOW | WILLOW TO HEATHER | HEATHER TO ASH | ASH TO CAMBIE | TOTAL |
|-------------------------------------------------|----------------------|-------------------------|-------------------------|--------------------------|-----------------------|----------------------|--------------|
| Metered | 0 | 4 | 17 | 14 | 21 | 21 | 77 |
| Passenger Loading and Disability Parking Spaces | 0 | 0 | 2 | 3 | 1 | 0 | 6 |
| Commercial Loading Zone | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Resident Permit | 12 | 7 | 0 | 0 | 0 | 0 | 19 |
| TOTAL | 12 | 11 | 19 | 17 | 22 | 22 | 103 |

TABLE 5: PROPOSED ON-STREET PARKING INVENTORY BY BLOCK AND PARKING TYPE

| | OAK TO LAUREL | LAUREL TO LAUREL | LAUREL TO WILLOW | WILLOW TO HEATHER | HEATHER TO ASH | ASH TO CAMBIE | TOTAL |
|------------------------------------------------------|----------------------|-------------------------|-------------------------|--------------------------|-----------------------|----------------------|--------------|
| Metered | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| Passenger Loading Zone and Disability Parking Spaces | 0 | 0 | 8 | 14 | 0 | 0 | 22 |
| Commercial Loading Zone | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Resident Permit | 7 | 3 | 0 | 0 | 0 | 0 | 10 |
| TOTAL | 7 | 3 | 8 | 14 | 0 | 3 | 35 |

Note: There will also be some changes to parking on side streets not shown in these tables.

4.6 STATUTORY RIGHTS-OF-WAY

Statutory rights-of-way (SRWs) are recommended at three locations:

- On the north side of W 10th Avenue, in the eastern half of the Heather-Ash block. This will extend the sidewalk into the vacant lot currently owned by PHSA. This SRW would allow retention of most trees in this block.
- On the south side of W 10th Avenue, for most of the block between Willow Street and Heather Street. This will extend the sidewalk into the lawn in front of the Heather Pavilion and allow a bikeway to be developed behind the trees and retention of on-street parking and two-way traffic flow.
- On the north side of W 10th Avenue, between Willow and Heather to accommodate disability parking spaces, bikeway, and sidewalk.